

Asymmetries of local economic impacts of digital entrepreneurship in Denmark: The case of Airbnb

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Abstract

This paper studies Airbnb as a form of digital entrepreneurship and its direct and derived socioeconomic effects on local economies in urban and peripheral regions. The study shows that the income generated through Airbnb is used to pay hosts' housing costs and contributes to increasing private consumption, which has positive impact on value creation in the local economy. The interregional quantity model applied in this study shows the economic value of Airbnb tourism in Denmark and demonstrates that the economic effects are greater in urban destinations than in peripheral areas. This paper contributes to the scarce literature on the economic impact of Airbnb and attempts to shed light on how the policies and regulations can be applied to diversify economic gains from digital entrepreneurship, so that it becomes favourable to the tourist destinations not only in the urban areas, but also in peripheral areas.

Keywords: sharing economy, digital entrepreneurship, Airbnb, urban- peripheral, regional economic modelling

1. Introduction

This paper investigates the potential economic impact of Airbnb on regional economies. Airbnb is a peer-to-peer (P2P) accommodation rental platform that allows individuals to rent out their dwellings to other individuals for a short period. This digital business form is often described as shared economy activity, which has grown rapidly over the last decade. The rise of Airbnb has been due to the increasing demand for short-term rental accommodation and the popularity of online digital platforms. The online platform, Airbnb.com, is a digital marketplace, that matches hosts and guests. The owners of houses or apartments (hereafter called ‘hosts’) can efficiently offer their unused rooms for short-term rental through the online platform, while other individuals (hereafter called ‘guests’) can search for the available spare rooms for short-term use. The hosts become entrepreneurs, earning extra income by renting out their spare rooms. At the same time, the guests, who are often tourists, can book accommodations at a lower price than other accommodation services offered at the destination.

The aims of this paper are 1) to contribute to the scarce literature on digital entrepreneurship, such as Airbnb, 2) to measure the value of Airbnb tourism in the local economy and 3) to shed light on how policies and regulations can be applied to diversify the economic gains from the digital entrepreneurship, so that it becomes favourable for tourist destinations not only in the urban areas, but also in peripheral areas. The studies of Airbnb in Norwegian rural and peripheral destinations have shown that Airbnb has already spread into rural and peripheral regions, although it is primarily an urban phenomenon (Strommen-Bakhtiar & Vinogradov, 2019).

Most businesses at the tourist destinations benefit from an increased number of visitors from Airbnb tourism, such as restaurants, cafeterias, and other tourism operators (e.g. museums, tourist attractions). They benefit from increased turnover when more tourists arrive at the destination (Fang, Ye, and Law, 2016; Tussyadiah and Pesonen, 2016; Leick et al., 2020). However, hotel sector organisations express concerns about Airbnb’s unfair competition for the prices of accommodation, and about hotels losing their market shares in the accommodation market (Zervas et al., 2017). The Airbnb company and Airbnb hosts are delighted to see the growth of the Airbnb market (Airbnb, 2019). The digital rental platform provides unique opportunities for individual entrepreneurs to get into markets as providers rather than consumers.

We argue that the sharing economy, including Airbnb, is an innovation, which creates new means of supply and expands economic activity within other areas of service. If the increase of supply induces extra demand on the market, we assume that this will lead to growth in the local and regional economies. Furthermore, it is likely that Airbnb business will affect the traditional hotel business and push it towards innovative changes to keep its customer base.

Sharing economy activity through digital platforms reflects the fact that citizens, especially urban citizens, have become digital entrepreneurs. They have become aware of the concept of resource-saving, where resources should be utilized more efficiently. It is cheaper for an individual (both, guest and host) when traditional employees are removed from the distribution chain of an economic activity by digital platforms (Richter et al., 2017; Kraus et al., 2018). Digital platforms function as a 'middleman', connecting users and providers to trade their goods and services. The shared economy is the new and unreversed business model, changing from B2B (business to business) to B2C (business to consumer) and further to C2C (consumer to consumer). The latter type is a new business model derived from the popular online trading or through digital platforms and is growing especially in the sharing economy. The idea of a sharing economy is that consumers share the same resources without switching ownership (Kraus et al., 2018; Richter et al., 2017; Sussan & Acs, 2017; Zervas, Proserpio, & Byers 2017).

The main purpose of this paper is to make regional economic analysis of Airbnb activities through a database we collected. Airbnb data is collected from different sources, through which we also discuss the geographic distribution of Airbnb listings, listing prices, and the potential for income generation in the local and regional economy. The data investigation provides a database for further analysis of the daily spending of Airbnb tourists, and to estimate total tourism revenue by given numbers of nights and the patterns of expenditure by Airbnb tourists. As a contribution to filling the gap in the literature, this paper aims to shed light on the economic consequences of Airbnb tourism. The Danish inter-regional economic model, SAM-K/LINE®_RTSA is applied in the analysis to evaluate the economic effects of Airbnb through tourist spending in cities and coastal- peripheral regions.

2. Theoretical framework of digital entrepreneurship and the sharing economy

Various studies of the sharing economy analyse the effects of the goods and services that are consumed by multiple users. When so-called ‘under-utilised’ products and services are returned to the supply chain, the value created by using idle resources generates additional economic wealth. Seen from the demand side, consumers benefit from the sharing economy by renting goods and services at a lower price and with lower transaction costs than buying or letting through a traditional provider (Zervas, Proserpio, & Byers 2017). Richter et al. (2017, p.301) define the sharing economy as “an economic model enabled and facilitated by the Internet and Web 2.0, in which users systematically share underutilized assets for monetary or nonmonetary benefits”.

The main driver for tourists to use the Airbnb digital platform is financial. A low-cost alternative to hotel accommodation is a primary motive for tourists to choose Airbnb. Tourists have always searched for ‘better value for the money’ (Balck & Crocau 2015; Botsman & Rogers 2011; Guttentag 2015; Lamberton & Rose 2012). Another motive is to keep social connections with the local communities (Tussyadiah & Pesonen 2016). Most Airbnb listings are located outside the central hotel districts, and thus they provide tourists with intimacy and unique experiences in authentic settings (Guttentag 2015; Oskam & Boswijk 2016). Therefore, on the one hand, lower cost and unique local experiences from Airbnb are primary motives for tourists and, on the other hand, Airbnb tourists are willing to spend more in other goods and services at the destination (Tussyadiah and Pesonen 2016).

As Tussyadiah and Pesonen (2016) point out, digital entrepreneurship through Airbnb transactions has shown a positive impact on local host communities, especially income generation. The business model has also induced more people to travel and change their travel patterns and behaviour. Tourists tend to travel more frequently due to the availability of low-cost accommodation, and they are encouraged to participate more actively in local activities. Moreover, Airbnb tourists tend to stay longer and spend more than traditional tourists. There is a need for further investigation of the effects of Airbnb on local economies in order to motivate well-informed policy making and local planning.

As a low-cost accommodation form, Airbnb is a competitor to the traditional accommodation providers. Zervas et al. (2017) analysed the effects of Airbnb supply on hotel revenue and found that Airbnb might cause reduced demand for small vacation hotels; however, the effect of Airbnb on the luxury hotels is limited. The authors claimed that Airbnb was taking over the role of low-cost hotels like bed and breakfasts and hostels, as it most likely substitutes these, but not luxury hotels, which are more oriented towards business tourists, whose expenses will be reimbursed by their companies. Neeser (2015) applied the same method as Zervas, Proserpio, and Byers (2013) on the hotel revenue in Nordic European countries, and their results show that Airbnb did not significantly affect hotel revenue, but it did influence hotel room prices. Moreover, some studies also showed that short-term rentals through Airbnb had no effect on the housing market or house prices. Pariolero (2016) established a method to test the relationship between houses sold and Airbnb development and provided evidence of insignificant correlation between Airbnb activity and house prices.

Felländer, Ingram, and Teigland (2015) believe that a sharing economy can save transaction costs (e.g., saving the intermediate costs replaced by digital transactions). A sharing economy can also save bargaining and other costs by online transactions. Fang, Ye, and Law (2016) provide an analysis of Airbnb's effect on local employment. The results showed that Airbnb makes a positive contribution to tourism employment in the local economy, as tourists increase the consumption of local products and services. However, one of the drawbacks of the Airbnb business model seems to be that it might substitute and crowd-out low-end hotel accommodation in future.

The increasing popularity of using digital marketplaces to conduct business is motivated by saving transaction and intermediate consumption costs. Traditional business models in service sectors are moving more towards digital business ventures and interactions online. Digital entrepreneurship is defined in many ways; however, all definitions emphasise the entrepreneurial aspect, i.e., sales, transactions, networking, conducted through the online platforms. Sussan and Acs (2017, p.66) define digital entrepreneurship as business activity “engaged in any sort of venture be it commercial, social, government, or corporate that uses digital technologies”. Sussan and Acs (2017) classify digital entrepreneurship as three types of digital business model: The user-intensive unpaid (e.g. Facebook, Instagram, where the users share free information), the sharing economy (e.g. Airbnb, Uber, where the unused commodities are shared with payment through online transactions)

and the user-intensive, both paid and unpaid (e.g. Spotify, dating sites, where some services are unpaid with the possibility to upgrade to the paid services).

In the rapidly growing digital era, the sharing economy business model grows through the reliability and trustworthiness of the business transactions, and this depends on the customer review system and the P2P model. The sharing economy through digital platforms diverts business activities from traditional business models to digital entrepreneurship and “challenges the traditional understanding of entrepreneurs” (Leick et al. 2020, p.4).

Digital entrepreneurship relies on a good infrastructure of internet providers, and therefore it is mainly an urban phenomenon, as there is more high-speed internet and communication in cities than in rural and peripheral areas. Geissinger et al. (2019) emphasised the changing lifestyle/condition and urbanity as one of the main reasons for growing digital entrepreneurship in the sharing economy. They studied the digitalisation of business activities through the history of digital start-ups and concluded that cities play an important role in imposing institutional change and in the growth of accessibility to information technologies and internet infrastructure. They argue that the recent trends in the development of digital entrepreneurship in the sharing economy point to future disruption, in both technological and institutional terms, in certain industries, thus pushing the governing institutions to adjust and change the regulatory approaches. One of the criticisms of digital entrepreneurship in the sharing economy is the absence of institutions that govern and regulate business activities, and this can lead to the failure of the model. As Kraus et al. (2018, p. 14) write: “Without fixing the tax requirements and the misuse of personal data, these models might not be sustainable, even in times of extreme digital entrepreneurship”.

Denmark is one of the first countries in the world to enter into a collaborative agreement with Airbnb in 2018, the Danish government regulated that Airbnb hosts in Denmark can rent out their spare rooms for up to 70 days per year, and as an incentive there is an income tax allowance on the income generated through Airbnb rentals (Danmarks Erhvervsministeriet, 2017; Statistics Denmark, 2018; Rasmussen, 2019).

In order to determine the best regulatory and institutional approaches, there is a need to understand how Airbnb as a form of digital entrepreneurship can contribute to local economies. Leick et al.

(2020, p. 4) argue that the digital entrepreneurship in the sharing economy business model, like Airbnb, is '*opportunity entrepreneurship*' (i.e. opportunity for using unutilised resources and expect expanding market demand), rather than '*necessity entrepreneurship*' (i.e. new business start-ups due to the lack of income opportunities). They follow Urbano and Aparicio's (2016) argument that entrepreneurship growth leads to local economic growth and they test this empirically by studying Airbnb's role on local economic development in Norway. Leick et al. (2020, p. 6) suggest a theoretical framework by linking digital entrepreneurship in the sharing economy to local economic growth. Their empirical model tests this link by using local unemployment as an indicator of economic growth. Their findings show that the increase in the unemployment rate does not affect Airbnb activity. They argue that Airbnb is *opportunity entrepreneurship* and therefore it does not show the *traditional* link of entrepreneurship to the *traditional* economic growth indicators, such as unemployment (which is more common in necessity-driven entrepreneurship activities). However, their study proves that Airbnb growth provides extra accommodation facilities and contributes to increasing the attractiveness of tourist destinations, thus increasing demand in the tourism sector (Leick et al. 2020).

This paper studies the Airbnb case empirically by following the principles of digital entrepreneurship in the sharing economy (Kraus et al. 2018; Richter et al. 2017; Sussan & Acs 2017). It accepts the opportunity-driven entrepreneurship nature of Airbnb (Leick et al. 2020) that has primarily been an urban phenomenon emerging within disruptive institutional change (Geissinger et al. 2019). The paper adds to previous empirical research by studying Airbnb's direct and derived economic effects on the tourism sector, both in larger urban areas, as well as in rural and peripheral regions in Denmark and it measures the overall economic value of Airbnb.

3. Collection and processing of data

Data is a critical issue in the analysis of Airbnb. Online short-term rental is a new economic activity, so there is no data available in Denmark before 2015. Airbnb Inc. has limited information regarding detailed datasets for research purposes. However, there are some Airbnb data sources available, and some variables can be collected there (Airbnb 2015). The aim of data collection is to estimate the number of Airbnb bed nights that tourists spent at the destinations, tourists' daily spending, room usage and the other categories.

To estimate the number of Airbnb bed nights, we need information such as percentage of usage of Airbnb listings, renting frequency, length of stay, and party size. Daily spending is collected by expenditure per person per night in different consumption categories. Total expenses of a tourist comprise daily spending and the rent paid to that hosts, excluding the Airbnb fees.

Length of stay is an important indicator, as it concerns the business strategy of the tourism destination and for the travel industry. Length of stay represents the ‘quantity’ of vacation purchased by travellers, as it has a direct implication on tourist spending and, consequently, income generated at tourism destinations. Data shows that tourists stay at an Airbnb accommodation longer than they stay at a hotel (Airbnb, 2015). This indicates the rapid growth in the Airbnb business model in the tourism economy and its potential impacts on both tourist behaviour and additional demand at tourism destinations. The indicators for Airbnb growth include the number of bed nights, length of stay, party size, and the activities participated in at destinations.

3.1 Airbnb data source

Airbnb data was collected via two main data sources: “Inside_Airbnb” and Tom Slee’s Airbnb data. Furthermore, some data was collected from Airbnb.com and Airdna.com. Some indicators were also obtained through Airbnb Inc.’s annual report by city (e.g. Copenhagen).

In Denmark, the total number of estimated bed nights is broken down into municipalities using the number of listings by different geographical regions. The data shows that most of the Airbnb listings started in 2015. In June 2016, the number of listings in Copenhagen was 16,178, of which 82% were for entire apartments (houses/summer houses) and the rest were room rentals. In 2017, the number of bed nights at an Airbnb was obtained from the Airbnb Inc. through VisitDenmark, which is national tourism organisation, which receives data directly from Airbnb Inc. every year.

3.2 Variables in Airbnb dataset

Variables in the dataset contain the ‘room_ID’, ‘host_ID’, ‘type of room’ (entire home/apartment, private room, and shared room), ‘location’, ‘neighbourhood’, ‘review’, ‘satisfaction’,

‘accommodation’, ‘number of bedrooms’, ‘number of bathrooms’, ‘price’, ‘min_stay’, and ‘latitude and longitude’.

3.3 Method of data transformation and stylised facts

The number of reviews of hosts by geography is used as a dummy variable for the number of nights rented out at an Airbnb. The size of travel parties and length of stay can also be found in the dataset. An alternative method is to estimate the average spending for an overnight stay. Two formulas are applied in the estimation of total tourist spending at an Airbnb, i.e. the number of bed nights at an Airbnb and the average spending of tourists at an Airbnb:

1) *Number of bed nights at an Airbnb*

$$= \text{number of arrivals} \times \text{average length of stay} \times \text{size of travel party}$$

2) *Total tourist spending at Airbnb*

$$= \text{number of bed nights} \times \text{average spending per person per bed night}$$

The average spending of Airbnb tourists in other daily consumption categories (such as, food, clothes, transport, etc.) is assumed to be similar to the spending of tourists who stay in small hotels. Such data is already available from visitor surveys in Denmark and is used in this analysis.

During 2015 and 2016, there were on average 22 nights per active host in the whole country. The average number of nights per host for the capital city area (i.e. Copenhagen and Frederiksberg municipalities) was much higher, about 30 nights per active host, compared to the average number of nights in destinations outside of capital city area, which was around 20. Therefore, the national average (22 nights per host) was applied in the calculations, with the assumption that the hosts must have received at least one booking for one year.

There was a significant difference between the number of gross listings and the number of listings that have received at least one booking for one year. A large proportion of the listings data comes from the 2016–2017 Airbnb Inc. data source.

We assume that the average number of bed nights outside of capital city area is the same for the whole of Denmark. A higher number of nights were observed in more popular destinations than in less popular destinations.

From the website www.airbnb.com, we find an average listing price per destination that should exclude 12% of the booking fee. Airbnb is a digital platform and is not necessarily located in the same municipality as where the bookings are made, and therefore the booking fee is not included in the price of Airbnb accommodation in the destination municipality. By taking this into consideration, the average spending of Airbnb tourists is re-calculated accordingly.

Table 1 shows the transformed dataset with the number of listings, prices, length of stay, party size, and the number of bed nights in 2016. The total listings in Denmark were 34,337, from which bed nights are estimated to be around two million. The four largest cities in Denmark, Copenhagen, Aarhus, Odense and Aalborg, dominate the Airbnb market, accounting for 60.4% of listings and 62% of Airbnb bed nights. The listing price in the capital city area is the highest.

As shown in Table 2, in 2017 the total number of bed nights at Airbnb was 3,171,000, of which 576,000 were domestic, and 2,595,000 were foreign tourists. The four largest cities had about two million overnights, accounting for 66.4% of the total, and the capital city area (Copenhagen and Frederiksberg) accounted for 56.5% of total bed nights.

Table 3 shows the total tourism revenue for Airbnb, which was DKK 5,969 million in 2017, with 68.3% of revenue concentrated in four main cities. The capital city area alone accounted for 58.9%. The data clearly indicates that Airbnb is an urban phenomenon, and a large percentage of Airbnb tourists are foreigners.

4. Methodology for evaluating Airbnb impacts on regional economies

According to the data records, 5% of total households have rented out their private homes to tourists in Denmark. This demonstrates how the simplicity and easy accessibility of digital entrepreneurship motivates any opportunity-driven person/household to be involved in the sharing economy business

model. The share of households involved in Airbnb activities is higher in the cities (e.g., Copenhagen) than in the provinces.

This new way of staying overnight does not involve traditional business elements such as a hotel or a food provider, but involves private individuals, or so-called opportunity-driven entrepreneurs, renting out their spare rooms or apartments to guests. Renting income is thus registered as private personal income, and not as business income, as is more common for traditional accommodation businesses. Therefore, Airbnb-generated income is not treated in the model as business income, but it is treated as personal income. In order to analyse the economic impact of Airbnb, the assumption in analyses were defined as follows: firstly, as individual persons hosts do not pay corporate taxes, although they pay personal income taxes. Secondly, they receive tax deductions for additional income from Airbnb. This was initiated by the Danish government in order to motivate people to register their Airbnb activities in the tax system. Thirdly, in the modelling, income from Airbnb rentals is treated as a part of the household income, which is linked to the housing sector and redistributed in the economy through private consumption of products and services.

The Danish inter-regional macro-economic model, SAM-K/LINE® (called 'LINE model' in this paper) is applied in this analysis. It is a regionalised input–output type of model with social accounting matrices (SAM) and the price-due circuit as its modelling framework. The model is based on basic economic theories; for example, it has three main actors: producers, households, and the government. The producers produce and deliver products and services to other producers (as intermediate inputs), to the government and households (as final demand). In contrast, households deliver labour force (as a production factor) to producers, and the government provides public services to households. At the same time, the government maintains welfare in the country through income taxes, corporation taxes, and product taxes, including value-added tax (VAT) (Madsen & Zhang 2010; Zhang 2014).

As an inter-regional macroeconomic model, the LINE model distinguishes geographical regions as 'place of production', 'place of residence', and 'place of demand'. The framework with SAM contains production sectors (J), factors (F), household types (H), and products and services (V). At the same time, the model system has a flexible degree of aggregation for sectors, factors (age, gender, and education), household types, and products and services.

According to the characteristics of inter-regional macroeconomic models, the LINE model also has several linkages and sub-models based on Keynesian economic theoretical principles. For example, the labour market sub-model can analyse labour supply and labour market demand through commuting matrices based on very detailed register data for the labour force. The tourism sub-model analyses consumers' shopping and tourist activities from the place of residence to the place of demand (i.e. location of shops, restaurants, destinations). There is a trade sub-model that describes how products and services are traded within and between regions. A more detailed description of these linkages, including inter-regional commuting, shopping, trade, and tourism flows, can be found in Madsen & Zhang (2010) and in Zhang (2014). These sub-models and linkages make it possible to calculate regional economic effects by changing exogenous variables.

The tourism sub-model in the LINE model is constructed based on the detailed tourist bed night data from Statistics Denmark and tourism survey data from VisitDenmark (VisitDenmark 2020). Tourism destination is assigned as the 'place of demand', and we treat domestic business tourist consumption as the demand from producers at the 'place of production' and tourism consumption by domestic leisure tourists as demand from households from the 'place of residence'. Tourism consumption by foreign tourists (both business and leisure tourists) is treated as a Danish export of tourism services; however, as tourism consumption occurs in the place of demand, it is also a part of private consumption in the tourist destination region.

In this analysis, we apply the demand approach (Keynesian), whereas the starting point is the changes in the demand side. Based on Airbnb bed nights and spending at the tourist destinations, the tourist demand by different consumption products at each tourist destination is established. The simulation exercise is based on the equilibrium in the model framework, where regional supply equals to regional demand for all products and services. In the model, investments and exports are treated as exogenous, while private and intermediate consumption are endogenously determined by the economy's capacity. The model also assumes that domestic markets of goods and factors are perfectly competitive. Capital and labour are perfectly mobile between sectors and regions.

For this paper, the experiment is established such that Airbnb tourism is removed from tourist demand in the Danish economy and the consequences are re-calculated and analysed. The model

analysis is based on a short-term solution, as in the long-term, technology evolution or changes in productivity evens out the short-term demand change and reach a new equilibrium. The model operates in several iterations, representing the economic reaction to the changes in final demand. When assuming there is no tourist demand for Airbnb overnight stays, the reduction is in the existing built-in data system in the different tourist destinations. Some regions experience decreasing demand for certain products and services caused by removing Airbnb tourism from demand. Production, employment, and income fall. The first round of production reduction causes the intermediate demand to fall as well. At the same time, the income reduction reduces demand from the household. Therefore, both intermediate demand and private consumption decrease, giving the second and third rounds of reduction. The amount of reduction in all rounds represents the total reduction in production, gross value added (GVA), and employment, and this was implemented in ten iteration rounds. All the variables in the model system are changed accordingly, both economic and governmental (income and other taxes) revenues. As the LINE model is an interregional economic model for Danish municipalities, this scenario experiment allows the model to estimate the Airbnb tourism economic value in intra- and inter-municipality economic linkages, both directly and derived.

5. Economic effects from Airbnb tourists: city versus peripheral regions

This section presents the results from the model experiment analysis for Airbnb tourism. The most common variables for measuring economic value are employment, income indicator – gross value-added (GVA), and income taxes. Table 4 shows Airbnb employment effects broken down into cities and peripheral regions. The total employment effects are 5,662 full-time equivalent jobs, of which 3,704 are direct employment effects and the rest are jobs derived from economic and geographic linkages. The employment effects show mostly in the four largest cities; they account for 61.5% of the direct employment effects and 53.5% of the total employment effects. In capital city area, Airbnb generates 2,449 jobs, accounting for 43.2% of the national total. Even though Airbnb is a digital entrepreneurial business form, its direct and derived job creation effects are still considerable in the local economies.

Besides generating jobs, Airbnb also generates additional economic value. Table 5 presents Airbnb's income (GVA) effects broken down into cities and regions. GVA is calculated as the total

value of produced goods and services without added production taxes. Airbnb generates in total DKK 3.4 billion GVA, of which DKK 2.1 billion is directly generated income. As shown in Table 5, more than one-half of income creation is from the four largest cities. In the capital city area, the total income generated by Airbnb tourists is DKK 1.4 billion, accounting for approximately 41.3%.

The state also benefits from the personal income generated from Airbnb. There are two sources of state revenues: personal income taxes and value-added taxes (VAT). Table 6 shows the results from personal income tax and VAT effects. Airbnb contributes revenues of DKK 556 million in income taxes, and DKK 812 million in VAT. As explained in the methodology section, Airbnb hosts do not pay VAT taxes, but Airbnb guests pay VAT on the products and services they buy at the destination localities. Unlike the above-mentioned economic measures (employment and GVA), the four largest cities do not obtain high shares of income tax effects, but they do have a high share (61.7%) of VAT effects. The reason for the lower personal income taxes in the cities is the commuting patterns. As house prices are relatively higher in large cities than in the surrounding municipalities, service-sector employees often live in the surrounding areas. Therefore, personal income tax effects are transferred to the residential municipalities that surround larger urban destinations.

To summarise, by combining tables 4 and 5, we can calculate the employment and income effects per million DKK of tourist revenue. According to the experiment results, DKK 1 million of tourist revenue from Airbnb tourists provides 0.7 jobs in Copenhagen and 0.96 jobs in Aarhus, which is the second largest city in Denmark. The job generation in the capital city area is lower than in other big cities and peripheral regions, which can be explained in higher productivity and economies of scale in the capital city area compare to the other regions. On average, Airbnb creates 0.95 jobs in Denmark per DKK 1 million of tourism revenue. As explained in Leich et al. (2020), the results from this experiment also show that Airbnb is not as large a job generator as hotels and other traditional accommodation businesses. However, Airbnb creates additional economic value through GVA and taxes. Likewise, we can calculate that DKK 1 million of Airbnb tourism revenue brings an additional gain of DKK 0.41 million of GVA in the capital city area and DKK 0.5 million in Aarhus. On average, Airbnb tourism generates DKK 0.58 million GVA per DKK 1 million revenue, in addition to state revenue in terms of personal income taxes and VAT.

In absolute terms, the socioeconomic effects of Airbnb are mainly in the urban areas, as most listings are in these areas (about 60 % of total listings in Denmark). However, in a relative comparison between the four big cities and the peripheral regions, we find total (direct and derived) employment effects per listing are higher in the peripheral regions than in the cities (index 0.19 in the peripheral regions against 0.15 in the cities). Similar results were observed for GVA effects per listing, which were higher in the peripheral regions compared to the cities (index 0.126 in the peripheral regions against 0.084 in the cities). Airbnb benefits peripheral regions more through income taxes, which is explained by the commuting patterns of workers from the suburban and outskirt municipalities to the cities. There were 0.035 revenues created per listing in the peripheral regions compared with 0.004 in the cities. The VAT effects show a little higher effect in the cities than in the peripheral regions (index 0.024 in the cities against 0.023 in the peripheral regions) (see Figure 1). The relative comparison shows how much Airbnb tourism affects the development of local economies in the peripheral regions. It indicates that Airbnb generates more socioeconomic value in the peripheral regions than in the cities, which could be a good indication for the policy makers and planners to encourage the development of Airbnb businesses in the peripheral areas.

6. Conclusion

As digital entrepreneurship, Airbnb has spread over many countries in the world. It is one of the main forms of business activity in digital entrepreneurship that allows the providers (hosts) and consumers (guests) to conduct business interaction at low cost and high flexibility through digital platforms. This form of business has already changed our everyday life: it has changed tourist behaviour with regards to travel, personal transport, cultural experience, and choice of destination.

Airbnb influences the current tourist markets. It stresses the value of co-creation, co-experience, and dynamics in the tourist supply and demand chains. It helps tourist destinations to provide visitors with a wide range of products and services at more affordable prices. Airbnb facilitates authenticity and encounters between tourists and the residents, although it creates challenges to traditional accommodation providers, especially small hotel businesses, in retaining their market share.

The aim of this paper is to study the socioeconomic value of Airbnb tourism and its direct and derived effects on the local economy in different types of destination municipality, such as urban

and peripheral. The scenario experiment was established for this analysis in the interregional quantity model. The results of the experiment show that Airbnb business is still an urban phenomenon and the absolute volume of economic effects is also greater in urban regions rather than in peripheral areas. The experiment also demonstrated that, even though the Airbnb business is a form of digital entrepreneurship with the business interactions on the digital marketplace, it generates considerable additional economic gains both, physically (i.e. Airbnb tourists spending on products and services) and geographically (i.e. creates additional demand at the different types of destinations, such as urban, coastal/ peripheral). The experiment showed that the relative economic effects of Airbnb tourism are higher in peripheral regions than in cities, especially considering job creation and income taxes. This points to future potentials for developing Airbnb activities in the peripheral regions through supportive policies and provisional institutions.

The digital entrepreneurship business model allows the flexibility and simplicity to conduct Airbnb business outside of urban areas, especially in the popular tourist destinations in peripheral municipalities. Creating policy instruments and increasing awareness in the population with high-speed internet coverage can motivate and diversify the economic potential of Airbnb tourism in peripheral destinations in Denmark. As other scholars have also emphasised, there is a need to create regulative and institutional systems around the digital forms of business activity in order to secure sustainable growth (Geissinger et al. 2019; Kraus et al. 2018).

The theoretical argument for supporting sharing economic activities, including Airbnb, is that the business model is innovative and creative, and it has derived effects on economic activity within some areas of service. If additional supply induces an extra demand on the market, while simultaneously saving resources and increasing productivity, this will lead to an expansion of the local and regional economies. Airbnb business activities, characterized by the digital transactions, create possibilities for individuals to become entrepreneurs and service providers. Therefore, there are also other issues that should be further discussed in future studies, for example, how to control the quality of services and how to regulate the activity to guarantee that the market is not disturbed, and society continuously benefits from it. For example, it has been suggested that we could implement licensing and registration. Individuals who plan to do Airbnb business would have to register or obtain a licence from the tax authorities. Policymakers can use this registration to guide

regional policy, such as in the peripheral regions, and possibly issue more licences than in the urban regions.

The research on Airbnb and digital entrepreneurship is in the early phase. Topics for further investigation cover a wide array of questions through the interdisciplinary fields. Rapidly growing Airbnb tourism stresses the necessity of accelerating the process of generating scientific knowledge about this form of tourism and developing an institutional and regulatory framework around it, in order to ensure that it continues to benefit the economy and society.

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Table 1. Number of listings, prices, length of stay, party size and estimated bed nights of Airbnb

Area	Number of listings	Average listing price	Number of nights (apartment)	Length of stay	Party size	Estimated nights
Copenhagen	17,714	680	529,412	4	2.2	1,164,706
Aarhus	2,004	495	40,080	4	2.2	88,176
Aalborg	505	443	10,100	4	2.2	22,220
Odense	524	442	10,480	4	2.2	23,056
Sum of 4 urban cities	20,747		590,072			1,298,158
Rest of other urban areas	4,201	636	107,969	5.2	2.9	260,608
Sum of rest coastal areas	9,389	574	187,780	5.2	2.9	538,928
Sum of Denmark	34,337		885,821			2,097,694

Note: Zhang and Marcussen (2017).

Table 2. Number of overnight stays at Airbnb in 2017 by cities and regions ('000)

Area	Domestic	Foreign	Total	% of the total
Copenhagen	142	1,649	1,791	56.5
Aarhus	69	136	205	6.5
Odense	20	36	56	1.8
Aalborg	19	35	55	1.7
Sum of the four cities	251	1,856	2,106	66.4
Rest of the Capital Region of Denmark	147	333	480	15.1
Region Zealand	39	89	128	4.0
Rest of the Region of Southern Denmark	67	153	220	6.9
Rest of the Central Denmark Region	41	92	133	4.2
Rest of the North Denmark Region	32	72	104	3.3
Total Denmark	576	2,595	3,171	100.0

Source: Visit Denmark and CRT Tourism model, SAM-K/LINE[®]_RTSA.

Table 3. Tourism revenue at Airbnb in 2017 by cities and regions (DKK mill.)

Area	Domestic	Foreign	Total	% of the total
Copenhagen	233	3,285	3,518	58.9
Aarhus	113	267	379	6.4
Odense	25	61	86	1.4
Aalborg	26	69	95	1.6
Sum from the four cities	397	3,682	4,079	68.3
Rest in Capital City Region	240	653	893	15.0
Zealand Region	48	173	220	3.7
Rest in The Southern Denmark Region	85	264	349	5.9
Rest in The Central Denmark Region	66	180	246	4.1
Rest in The Northern Denmark Region	43	138	181	3.0
Total Denmark	879	5,089	5,969	100.0

Source: CRT Tourism model, SAM-K/LINE[®]_RTSA.

Table 4. Airbnb employment effects in cities and the regions (number of full-time equivalent jobs)

Area	Direct effects	Total effects	% of the total
Copenhagen	1,871	2,449	43.2
Aarhus	260	362	6.4
Odense	65	101	1.8
Aalborg	81	120	2.1
Sum from the four cities	2,278	3,031	53.5
Rest in Capital City Region	700	1,283	22.7
Zealand Region	223	499	8.8
Rest in The Southern Denmark Region	236	392	6.9
Rest in The Central Denmark Region	166	304	5.4
Rest in The Northern Denmark Region	101	153	2.7
Total Denmark	3,704	5,662	100.0

Source: CRT Tourism model, SAM-K/LINE®_RTSA.

Table 5. Airbnb income effects in cities and the regions (DKK mill.)

Area	Direct effects	Total effects	% of the total
Copenhagen	980	1,426	41.3
Aarhus	125	191	5.5
Odense	35	57	1.7
Aalborg	38	63	1.8
Sum from the four cities	1,178	1,737	50.3
Rest in Capital City Region	460	873	25.3
Zealand Region	182	351	10.2
Rest in The Southern Denmark Region	132	230	6.7
Rest in The Central Denmark Region	91	175	5.1
Rest in The Northern Denmark Region	57	88	2.5
Total Denmark	2,100	3,452	100.0

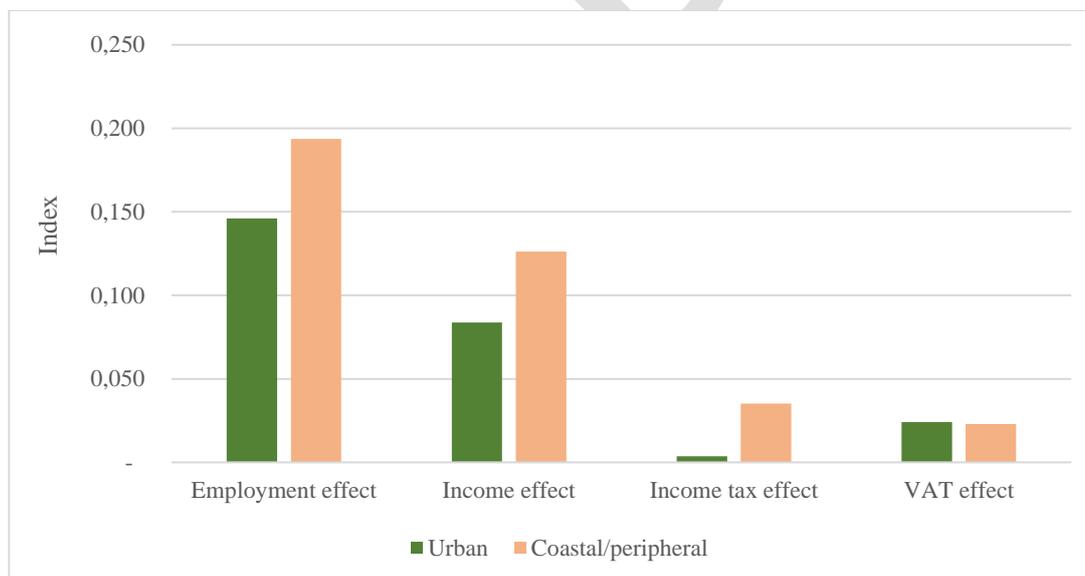
Source: CRT Tourism model, SAM-K/LINE®_RTSA.

Table 6. Airbnb effect on income taxes and value-added taxes (VAT) in cities and the regions (DKK mill.)

Area	Income taxes	VAT
Copenhagen	29.7	428.7
Aarhus	23.5	47.8
Odense	14.4	11.3
Aalborg	9.6	13.7
Sum from the four cities	77.2	501.4
Rest in Capital City Region	312.1	149.6
Zealand Region	92.1	50.0
Rest in The Southern Denmark Region	40.9	48.9
Rest in The Central Denmark Region	40.7	37.6
Rest in The Northern Denmark Region	16.2	24.8
Total Denmark	556.2	812.4

Source: CRT Tourism model, SAM-K/LINE[®]_RTSA.

Figure 1. Total socioeconomic effects of Airbnb per listing by type of region (2017)



Source: own calculation.

Note: Y axis is the index for the effects of per listing, which is calculated as the ratio of the total effect to the number of listings by type of region.